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Aerobic Bacteriological Profile of Surgical Site Infections and their Antibiogram

Agrawalla S, Meher BP

Department of Microbiology, VSS Institute of Medical Science and Research, Burla, Odisha, India

Abstract: ***This prospective study, conducted from July 2022 to June 2023, explores the incidence and antimicrobial resistance patterns in surgical site infections (SSIs) in a hospital setting. A total of 1120 patients undergoing clean and clean-contaminated surgeries were examined, with samples collected from clinically suspected SSIs using aseptic methods. These samples were cultured on 5% sheep blood agar and MacConkey agar, and bacterial isolates were identified and subjected to antimicrobial susceptibility testing using the Kirby Bauer disc diffusion method, according to CLSI guidelines. The study found a high incidence of SSIs, with Staphylococcus aureus and Escherichia coli being the predominant isolates. Notably, resistance patterns showed high resistance to Amoxyclav and sensitivity to Imipenem. The findings underscore the necessity for continuous surveillance of microbial patterns and antibiotic susceptibility to combat the rise of multidrug-resistant pathogens and improve SSI management strategies.***

Keywords: Surgical site infections, antimicrobial resistance, Staphylococcus aureus, Escherichia coli, infection control

1. Introduction

- Definition - Surgical site infections (SSIs)are defined as infections that develop at the surgical site within 30 days of surgery (or within 90 days for some surgeries such as breast, cardiac and joint surgeries including implants) [1]
- SSIs were estimated approx. 31% of all HAIs, contributed 20% post-surgical readmissions as well.[3]
- This situation is more severe in developing countries like India.[3]
- SSI contribute substantial rate of mortality, significant morbidity, considerable prolongation in length of hospitalization and added treatment expenses. [3,4]

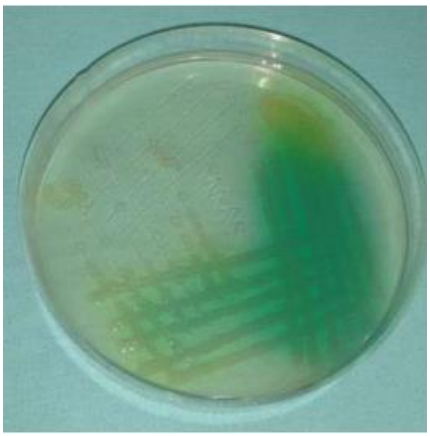
Objective

- To study bacterial isolates from pus samples of clinically diagnosed SSI cases.
- The sensitivity pattern of isolated bacteria.

2. Materials & Method

- A hospital based prospective study conducted from July 2022 to June 2023 at Department of microbiology.
- In this study 1120 patients of clean and clean contaminated surgeries from various surgical department were included.
- Samples from clinically suspected SSIs were collected by aspiration or by sterile swab with aseptic precautions.
- Samples received were immediately inoculated and streaked onto 5% sheep blood agar and MacConkey agar inside biosafety cabinet.
- Plates were incubated aerobically at 37 o C for 24 hours.
- Isolated organism were processed and identified according to standard bacteriological technique.

The antimicrobial susceptibility testing was done by Kirby Bauer's disc diffusion method as per CLSI guidelines**.**



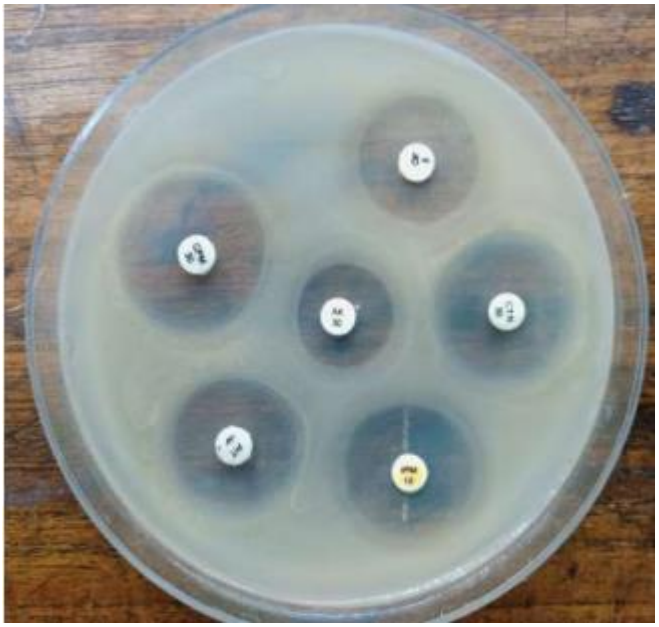
Pseudomonas SPP.

Growth on Nutrient AGA

STAPHYLOCOCCUS AUREUS ON MACCONKEY AGAR

ESCHERICHIA COLI IN MACCONKEY AGAR

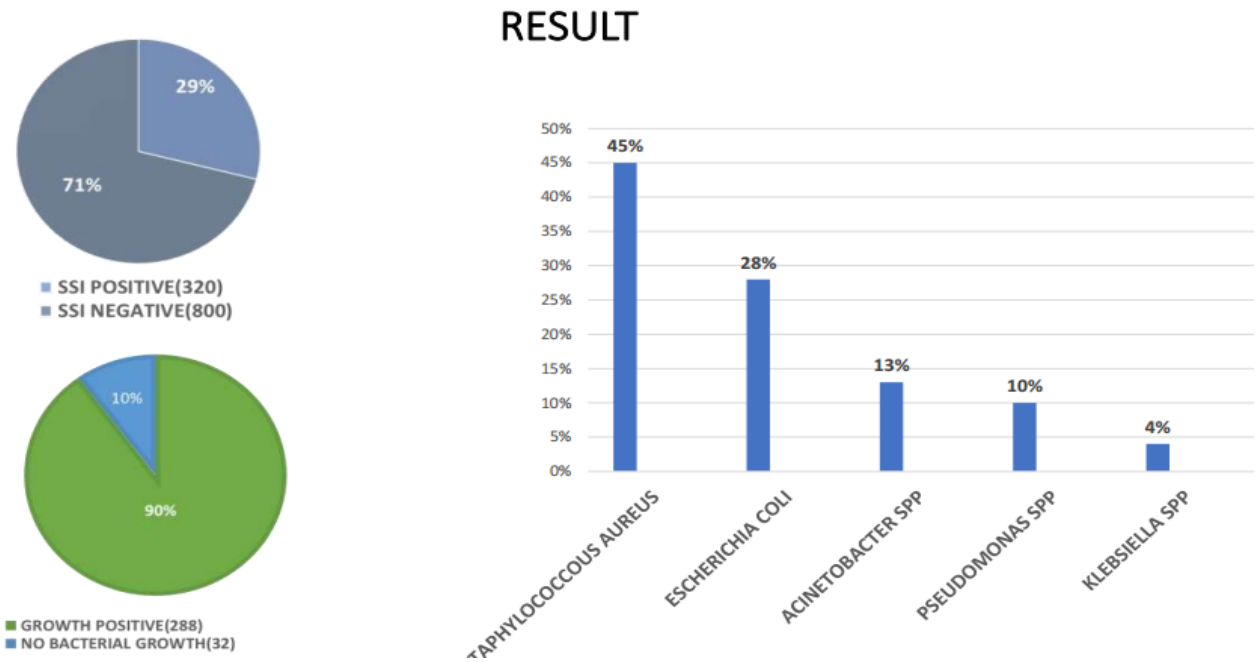
Antibiotic Susceptibility Test Plate

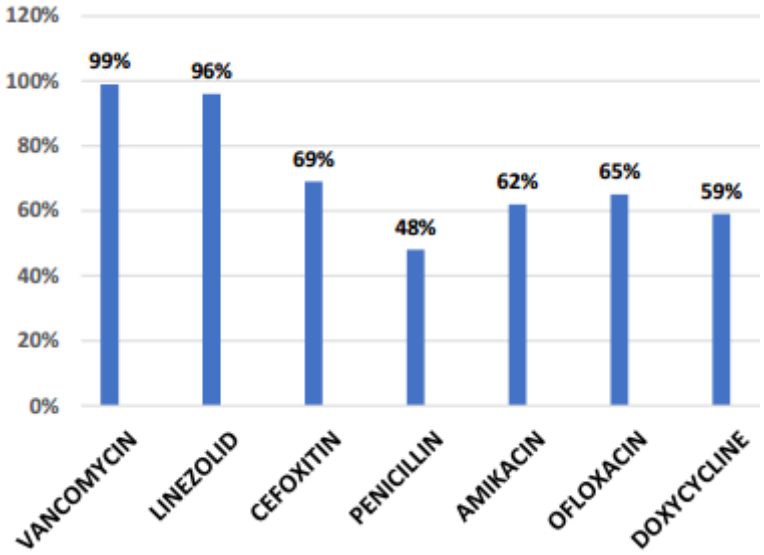


Escherichia Coli

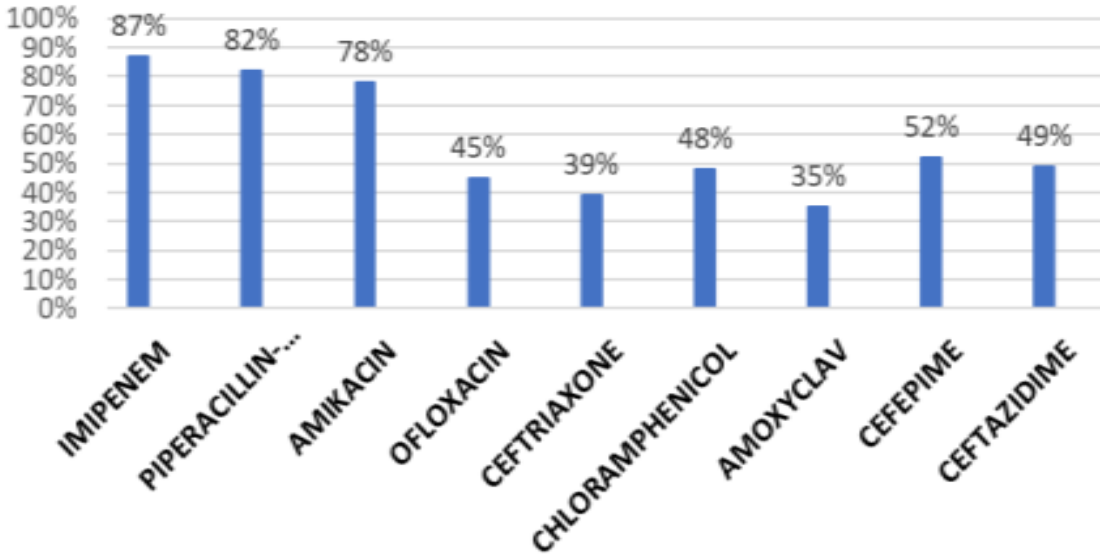
STAPHYLOCOCCOUS AUREUS

Biochemical Tests for Escherichia Coli





SENSITIVITY PATTERN OF GRAM POSITIVE ISOLATES



Sensitivity Pattern of Gram Negative Isolates

3. Discussion

- In our study incidence of SSIs is 29% which is higher than study by **Kumar et al.**
- Staphylococcous aureus is predominant isolates in SSIs in my study, similar observation was also reported by **Golia S et al** study.
- In my study Escherichia coli is predominant isolates among gram negative similar to **Ramesh et al** study.
- In our study MRSA is 31% which is higher comparative to **Madhusudan NS et al** study
- Gram negative isolates were mostly sensitive to Imipenem and maximum resistance to Amoxyclav similar to **Mukagendaneza et al** study**.**

4. Conclusion

- Periodic surveillance of bacteria and antibiotic susceptibility is necessary due to multi drug resistant pathogen rising as a main cause of SSI.
- Active surveillance of SSI, compliance observation, training of health care provider to prevent SSI.

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